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AGRICULTURAL NEWS LETTER

VOL. 13 - NO. 2 MARCH-APRIL, 1945

This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations of the du Pont Company and its subsidiary companies. It also contains published reports and direct contributions of investigators of agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.

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U.S.D.A. REPORTS ON SEEDS, FERTILIZERS, INSECTICIDES FOR VICTORY GARDENS

The supply of vegetable seeds this year promises to be adequate for all Victory Gardens, according to the U. S. Department of Agriculture.

"Since shortage of help may mean a delay in orders that arrive in a rush at the eleventh hour, growers are advised to order their seeds as early as possible," the statement says.

It adds that while supplies of fertilizer are not quite so large as last year, there will be enough to meet Victory Garden needs. The same grades used in 1944 are on the market this year for various parts of the country, as follows:

	Analysis
Atlantic Seaboard	5-10-5
Central Part of Country	4-14-4
West	6-10-4

The Department also advises that insecticide supplies will be about as large this year as last, but urges gardeners to buy early.

NOTE: Two leaflets of special interest to Victory Gardeners will be sent on request to the Editor, Du Pont "Agricultural News Letter," Wilmington 98, Del.

"'Semesan' Seed Treatment Tips for Victory Gardeners" deals with control of seed decay and plant diseases such as damping-off, "the most dreaded of seedling diseases." It says "Semesan" fungicide is packaged in sizes ranging from the ten-cent third-of-an-ounce envelope, to 100-pound drums for large-scale seed-treating operations.

"Two New Du Pont Dusts -- Potato Dust and Garden Dust" says these products, developed especially for potatoes and farm garden crops, give the grower "a combination insecticide and fungicide that is effective against a wide range of insects and diseases."

Agricultural News Letter (Du Pont)
Vol. 13 No. 2 March-April, 1945

DR. E. K. BOLTON, DU PONT CHEMICAL DIRECTOR, RECEIVES PERKIN MEDAL

The Perkin Medal was founded in 1906 in commemoration of the fiftieth anniversary of the coal-tar color industry and was first awarded to the eminent English scientist, Sir William Henry Perkin, the inventor of aniline dyes. The society has selected a medalist each year since then. The award may be made to any member of the chemical profession residing in the United States. It is made for "outstanding work in applied chemistry done at any time during his career, whether this work proved successful at the time of execution or publication, or became valuable in subsequent development of the industry."

Greatly increased research programs, designed to "make up the lost time" in improving the American standard of living, will be launched by the chemical industry once its laboratories have been relieved of war duties, Dr. Elmer K. Bolton, chemical director of E. I. du Pont de Nemours & Company, said on January 5 in accepting the Perkin Medal awarded to him for outstanding accomplishments in the field of industrial research.

But he warned that this expansion faces the grave war-caused handicap of a serious shortage of well-trained chemists -- "a shortage, I fear, that will be felt for a number of years."

"Since World War I, the chemical industry has made remarkable progress," Dr. Bolton told members and guests of the American Section of the Society of Chemical Industry in New York City, "due in a very important measure to the friendly attitude of the government toward research. Granted a continuation of this attitude, organized research will go on creating new products, for what remains to be done is far greater than anything that has been accomplished in the past."

Speaking on the subject, "Du Pont Research," Dr. Bolton explained that this was a story that had never to his knowledge been told in more than a fragmentary way. As evidence of what this research has meant, he commented that in 1942 almost half of the gross sales of the Du Pont Company consisted of products that either did not exist in 1928, or were not then manufactured in large commercial quantities.

To show the importance attached to research in the Du Pont organization, Dr. Bolton quoted the following remark made to him in the depression days of 1932 by Lammot du Pont, then president of the company: "You know, it is more important to carry out research than to pay dividends."

Continued on next page

Dr. Bolton, the 39th recipient of the Perkin Medal, which is one of the highest awards that can come to a man in the chemical field, stressed that "research becomes of service in the ordinary walks of life only when it can be translated into processes or products which contribute to raising the scale of living, to the improvement of health, to the promotion of industry and agriculture, and to the national defense.

"The great store of scientific knowledge which has been accumulated in the past through the careful painstaking investigations of countless scientists becomes of value to society when research points the way to harnessing it to a practical application.

"It should be emphasized, however, that the research organization is only part of the team necessary to bring the fruits of scientific work to the service of mankind. It requires the wisdom and courage of management to make the investment, a capable engineering organization to design the plant, an able and experienced production organization to make material of marketable quality and suitable cost, and a sales organization to develop markets."

"From the Colonial days down to the present," Dr. Bolton continued, "our patent system has been a great stimulus to research, and an incentive to the creation of new products and processes. Large expenditures such as were involved in developing neoprene and nylon, for example, were justified because of the patent protection it was possible to establish. Were it not for this protection, the stimulus to research and invention would be greatly diminished, whether by an individual, by small business, or by so-called big business.

"There is one other element that should be mentioned. It is public support and favor, which must be earned. It must be earned by operating in the public interest. Without it the team effort is foredoomed. Out of the experience of many years I can say that our company's activities are uniformly motivated by a clear sense of its responsibility to the American people."

Dr. Bolton pointed out that the research which developed both neoprene and nylon was carried out during the years of business depression. He said that "the fortunes of a research organization should not follow a profit and loss curve."

Since the advent of organized industrial research, he continued, modern industry has advanced human knowledge in a way that was previously impossible, and "beyond that, it converts the newly gained knowledge into a higher standard of living far more quickly and on a larger scale. Today, the achievements of modern industrial research have led the American people not only to accept the new, but to expect and demand it."

Many of the important products of the chemical industry, Dr. Bolton explained, are the results of the research organization which grew out of the Du Pont Company's part in establishing an American dye industry, starting in 1916 when the nation was almost wholly dependent upon Germany for these materials.

Continued on next page

"From the beginning," he said,"it was recognized that the manufacture of dyes could serve as the backbone of a synthetic organic chemical industry."

The Du Pont Organic Chemicals Department, which produces dyes, he said, now manufactures more than 2,000 materials.

He attributed the success in large part to courageous investment. "At the end of the first five years," he said, "the company had invested, in plants and working capital, $22,000,000, and in addition had suffered operating losses to the extent of $18,000,000."

Accepting the Perkin Medal from Dr. Marston T. Bogert, professor emeritus of chemistry, Columbia University, and senior past president of the Society of Chemical Industry, Dr. Bolton said:

"I am deeply conscious of the fact that any credit for research accomplishments with which I have been connected belongs to the organizations of able research chemists with whom it has been my privilege to be associated. As their representative, I am happy to accept this award because, in honoring me, you honor them."

Dr. Norman A. Shepard, chairman of the American Section of the Society, presided at the dinner.

Dr. C. M. A. Stine, a vice president of the Du Pont Company, who was awarded the Perkin Medal in 1940, discussed Dr. Bolton's professional accomplishments. Foremost among them were his leadership in the development of neoprene, the first general-purpose synthetic rubber, and his direction of nylon research.

Lammot du Pont, chairman of the board of the Du Pont Company, spoke of the personal side of Dr. Bolton's career. Dr. Bolton was born in Philadelphia, and studied at Bucknell University, Harvard, and at the Kaiser Wilhelm Institut für Chemie, Berlin. He began work with the Du Pont Company in 1915 as a research chemist at the Experimental Station in Wilmington, Del. He has been chemical director of the company since 1930.

NOTE: The complete text of Dr. Bolton's address in printed booklet form will be sent upon request to the Editor, Du Pont "Agricultural News Letter," Wilmington 98, Del.

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COMMITTEE REVIEWS TECHNICAL AND PRACTICAL BACKGROUNDS OF UREA FEEDING

Circumstances surrounding the recent deaths of 15 or 20 cows in New York State, attributed to an excessive amount of urea in the mixed feed, were discussed at a meeting held in Albany, November 29, 1944, at the request of C. R. Plumb, director, Bureau of Food Control. Representatives from the New York Department of Agriculture, Cornell University, the feed industry, and the Du Pont Company attended.

A committee was appointed to summarize the conclusions reached and to review the technical and practical backgrounds of urea feeding practices.

The following is the report of the committee, members of which were:

Earl Foster, assistant commissioner of agriculture, N. Y. State;
K. L. Turk, professor of animal husbandry, Cornell; and
L. E. Bopst, secretary, Association of American Feed Control Officials, and state chemist of Maryland.

ALL EXPERIMENTS SHOW UREA, PROPERLY USED, SAFE, EFFICIENT PROTEIN SUBSTITUTE

Since World War II, urea has been utilized in this country to increase available protein in cattle and sheep feeds. Extensive studies at leading agricultural colleges and experiment stations in the United States demonstrate without exception that urea, in scientifically safe amounts, is properly assimilated. It can efficiently replace a limited portion of the normal protein in the diet of such ruminants as dairy cows, growing heifers, steers, and range cattle. While it can be utilized by sheep, urea has not given completely satisfactory results for fattening lambs. The conversion is effected in the rumen, first, by a decomposition into ammonia and carbon dioxide, followed by absorption of ammonia into the semi-solid food mass and subsequent micro-organic activity to produce suitable forms of protein. Correct utilization is dependent in some degree upon the other components in the diet.

All experimental results show that urea is most safe and efficient as a protein substitute when it supplies approximately one-third of the total crude protein in the grain ration fed to the ruminant. This indicates not more than 3% urea, equivalent to 8.6% crude protein in the average 16 - 24% grain ration, or not more than 1% of the total ration including roughage, on a dry weight basis. (See Editor's footnote on page 37.)

Continued on next page

Urea is not converted to useful protein in the digestive systems of non-ruminants such as swine and poultry, but merely passes through unchanged and without harm to the animal.

Recognition of the employment of urea as a partial protein supplement as well as limitations in its use is given by the Association of American Feed Control Officials' Resolution #20, adopted 1941 and amended 1944, which reads in part, ".... Urea is to be used only in such limited quantities as to insure the total amount present does not exceed 3% of the total grain ration."

Any hazard or limitation in the use of urea as a feedstuff ingredient should be made clear to all feed manufacturers and mixers, since well over 700,000 tons (14,000,000 bags) of commercially mixed feed containing urea were fed in the United States during the past year with satisfactory results.

The recent animal deaths in New York reveal the fact that a high concentration of urea can be toxic. Some sacks of a commercial mixed 18% feed, found to contain 16 - 20% urea, caused the collapse and subsequent death of cows within 15 to 20 minutes after feeding. The error resulted from an operator failing to stop the flow of urea during a temporary shutdown of the mill. Feed from another manufacturer involved lumpy material causing incomplete mixing and localized high concentration of urea. It is probable that the affected cows consumed three-fourth of a pound or more of urea at a single feeding. Presumably the toxic effect resulted from formation of a large excess of ammonia, over and above the animals' assimilative ability. However, experimentation has shown that the odor of ammonia in urea feeds does not necessarily indicate a hazardous condition, but merely that some potential protein is being lost.

Summarizing, it can be said that the enormous number of animals consuming urea rations in experimental and commercial feeding in the past furnish ample evidence that no danger exists, or no harmful effects can ensue, as long as the urea content of the grain ration is not greater than 3%. It appears extremely important that the recommended limits and feeding instructions be strictly followed, and every precaution taken to insure thorough distribution of urea in the feed when manufactured. Feed manufacturers state that there is little possibility of urea segregation in the bags, if the feed has been mixed properly. Neither does it seem likely that urea will settle out in mixed feeds shipped in a loose condition.

EDITOR'S FOOTNOTE: The Association of American Feed Control Officials, in annual meeting, Washington, D. C., October 27-28, 1944, adopted the following resolution: "The Executive Committee moves that that part of Resolution 20 which reads as follows, 'The protein equivalent of combined urea and commercial nitrogen be no greater than one-third of the total crude protein nitrogen,' be changed to read 'that urea is to be used only in such limited quantities as to insure the total amount present not to exceed 3% of the (grain) ration.'"

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"Cost of Dust Seed Treatments Is Extremely Low"

"Perhaps no type of plant-disease control has received more attention in recent years than seed treatment with fungicidal dusts. Fungicidal dusts can be applied rapidly by means of a simple hand-operated drum treater or by power-driven treaters, and it is possible to treat all of the planting seed for the average farm in a comparatively short time. Cost of dust seed treatments is extremely low, varying from 2½ cents per acre for small grain to about 10 cents per acre for cotton."-- Dr. V. H. Young, Plant Pathologist, University of Arkansas College of Agriculture.

DUSTING COTTONSEED IMPROVES STANDS, INCREASES VIGOR OF PLANTS, REDUCES BOLL-WEEVIL HAZARDS, AND CONTROLS SEED ROTTING AND DAMPING-OFF

Treatment of cottonseed with fungicidal dusts has proved especially valuable because it not only improves stands and increases the vigor of young plants, but makes earlier planting possible.

So says Dr. V. H. Young, Plant Pathologist at the Arkansas Experiment Station, who explains that early planting allows the farmer to extend planting over a longer period and reduces the hazards of boll-weevil attacks which are apt to be most serious on late-maturing cotton.

Treatment Also Reduces Leaf Spotting and Boll Rotting

"Although cotton has always been subject to serious attacks from both seed-borne and soil-borne organisms, it never seemed feasible to give it liquid seed treatments because the linters soak up the liquid and make it difficult to dry out the seed or to plant it without drying," Dr. Young says. He adds that dust treatments, on the other hand, have proved highly efficient for the control of seed rotting and damping-off of cotton during the cool, wet weather so common during the planting season.

"They have also greatly reduced the occurrence of leaf spotting and boll rotting by destroying the germs of these diseases on the seed coat and linters," he adds.

Continued on next page

Discusses Seed Treatment of Other Crops In Arkansas

Of other crops grown in Arkansas, Dr. Young says:

"Unfortunately, the treatment of seed grain and sorghum seed, which is just as valuable as cottonseed treatment, much cheaper and more easily carried out, is far less common in the state. This is reflected in the abundance of such diseases as oat smut, sorghum smut, covered smut of barley, and the serious barley leaf spots. Serious losses are resulting year after year in Arkansas due to the failure of the farmers to treat seed of grains, sorghums, and truck crops.

"Only a few crops have failed to show worthwhile benefits from seed treatment. Practically all field and truck crop seed benefit, and over a period of years will show handsome profits from seed treatment. The more important crops whose seed should be treated are cotton, oats, barley, wheat, sorghum, shelled peanuts, spinach, tomatoes, English peas, cucumbers, melons, sweet potatoes, and practically all common vegetables and flowers."

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SOME SEED DISINFECTANTS KILL DISEASE ORGANISMS BY CONTACT --- OTHERS RELEASE TOXIC VAPORS OR FUMES

Some chemical seed disinfectants control plant-disease and seed-decay by killing certain seed-borne and soil-borne fungous and bacterial organisms on contact, while others release toxic vapors or fumes that do the trick.

The vapor or volatile group includes formaldehyde, ethyl mercury phosphate, and ethyl mercury chloride, the latter two being the active ingredients in New Improved "Ceresan" fungicide and 2% "Ceresan" fungicide, respectively.

The non-volatile compounds that kill by contact include copper oxide, copper carbonate, nitrophenol mercury, chlorophenol mercury, and tetramethyl thiuram disulfide, the latter two being the active ingredients in "Semesan" fungicide and "Arasan" fungicide, respectively.

Light and shriveled seed, weed seed, trash, smut balls, and dirt should be removed; and all seed should be thoroughly cured or dried before planting.

Cracked or injured seed should not be planted. And, according to a recently revised Du Pont Semesan leaflet, "Commercial Seed Treating," which will be sent on request to the Editor, Du Pont "Agricultural News Letter," Wilmington 98, Del., it is usually unwise to apply more or less than recommended amounts of disinfectant.

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"RE-GINNING AND DUSTING COTTON SEED HELP WIN THE WAR"

"Approximately 9 to 15 per cent of the weight of cotton seed, or 180 to 300 pounds per ton, is short lint. Two-thirds to three-fourths of this would be suitable for industrial purposes.

"Approxiamtely 17,000 tons (34,000,000 pounds) of cotton seed are planted each year in North Carolina. If the farmers would take an average of 180 pounds of lint from each ton of this seed before it is planted, they would make available around 3,060,000 pounds of linters to industries providing war supplies to the armed forces.

"Re-ginned seed should be dusted with some disinfectant before planting. At plants suitably equipped, cleaning, re-ginning, and dusting can be done in one continuous operation with a minimum of cost and marked benefit to the seed." -- Dr. S. G. Lehman, Department of Plant Pathology, North Carolina Agricultural Experiment Station.

Two distinct treatments of cotton seed, "each of which works out as a contribution to winning the war," are cited by Dr. S. G. Lehman, Associate in Plant Pathology, North Carolina State College of Agriculture at Raleigh.

One is re-ginning to reduce planting difficulties, to increase emergence especially on dry soil, and to save millions of pounds of linters, needed in great quantities by wartime industries. The other is treatment with 2% "Ceresan" or with New Improved "Ceresan" seed disinfectants to save many seedlings that would otherwise die of disease and to make possible use of a lower seeding rate.

Writing in the North Carolina Agricultural Experiment Station's Quarterly, "Research and Farming," Vol. 1, No. 2, Dr. Lehman points out that in ginning cotton to separate the seed from the fibers useful in manufacture of yarn, the careful gin operator adjusts the saws to remove all the long fibers and as few as possible of the short ones.

"The short fibers, often called linters, are left on the seed," he says. "The seed for the next crop is usually planted without removal of the short lint. This fuzzy cotton seed is very likely to have a considerable load of spores of disease-producing fungi and bacteria mixed with the short lint on its surface. Numerous experiments have shown that it is a good practice to treat the planting seed with some disinfectant before planting. This practice saves many seedlings that would otherwise die of disease and makes possible the use of a lower seeding rate. The greatest gains from this sort of treatment are

Continued on next page

observed when cold rainy weather follows planting and smallest gains when the planted seed encounters warm, dry weather during the germination period."

Treatment Saves One Out of Every 4 or 5 Bushels Needed for Planting

"On the average, however, the gains from dusting the seed are such that the planting rate can be reduced 20 to 25 per cent," he adds. "Thus, one bushel of planting seed can be saved out of every 4 or 5 bushels that would be required if untreated seed were used. The seed saved and not treated for planting can be sent to the oil mill for conversion into food, feed, and fertilizer."

The remainder of Dr. Lehman's article follows:

"The short lint on cotton seed not only carries spores of disease-producing organisms but contributes to the difficulties encountered in planting the seed. It is difficult to sow a uniform distribution of lint-covered seed without putting down many more seed than the number of plants desired in the final stand. Furthermore, the lint retards appreciably the emergence of the seeds planted in dry soil.

"To test the effect of removal of the lint on the value of cotton seed for planting purposes, experiments were made comparing germination and survival of seedlings from natural seed with seed from which a part or all of the lint had been removed before planting. In a series of experiments made in 1941, seed having a lint index of 14.9 or 298 pounds per ton was used. This seed was divided into several portions, one of which was left with the lint intact as a control. Other portions were run one, two, or three times through a de-linter gin, thus removing an increasingly larger proportion of the lint and reducing the lint index. An additional portion was treated with concentrated sulphuric acid, removing all the lint, and leaving the seed naked.

"After treating the different portions as indicated above, each portion was divided into two lots, one to be dusted with 5% "Ceresan" (New Improved "Ceresan") before planting, the other to be left undusted. Thus, a number of lots were obtained which had been given different treatments with respect to removal of the lint and dusting. The accompanying table gives the average results from six plantings made in North Carolina.

EFFECT OF RE-GINNING ON COTTON STANDS

Treatment of Seed	Lint removed per ton of seed	Linters on seed	Relative No. of plants at thinning time	Relative rate of germination
	lbs.	%		
Control, no treatment	0	14.9	100	100
Re-ginned, light cut	136	8.1	113	112
Re-ginned, moderate cut	180	5.9	122	112
Re-ginned, heavy cut	218	4.0	123	122
De-linted with acid	298	0	153	150

Continued on next page

Results of Experiment

"The results of this experiment show that removal of part of the lint by re-ginning the planting seed was followed by an increased number of plants at thinning time. These increases, ranging from 13 to 23%, were all highly significant. Removal of 180 or 218 pounds of lint per ton of seed was significantly better than removal of only 136 pounds. It is doubtful if more than 218 pounds could have been removed without doing mechanical injury to the seed. Re-ginning also increased the rate of seedling emergence 12 to 22 per cent above that of the seed from which no lint had been removed. The acid de-linted seed, from which all lint had been removed, gave a greater increase in number of plants and more rapid germination than re-ginned seed. This was due chiefly to more complete destruction of spores of disease organisms on the fraction of the seed which had not been treated with "Ceresan" dust and to changes induced on the seed surface permitting more rapid uptake of water.

"The results given in the table indicate that acid de-linting may be a better treatment for cotton seed than re-ginning. The acid is expensive, however, and the lint removed from the seed is destroyed in the operation and cannot be used to defray cost of treatment. Moreover, sulphuric acid is needed in the war industries and is not now available for seed treatment purposes. In the re-ginning operation the linters removed from the seed are not destroyed but are saved and may be traded to the ginner to defray a large part of the cost of the operation. In peace times cotton linters are used for a variety of industrial purposes such as manufacture of cotton felting, cellulose acetate, plastics, smokeless powder, and explosives. The present war effort insistently demands an unlimited supply of raw material for manufacture of gunpowder. Clean cotton linters is a valuable material for this purpose."

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IOWA VETERINARIAN RECOMMENDS DRENCHING SHEEP BOTH IN SPRING AND FALL

Treatment of sheep with phenothiazine this spring and again next fall is recommended by Dr. K. W. Stouder, Extension Veterinarian at Iowa State College, for control of stomach and nodular worms.

He says that while most of the worm eggs are destroyed on the pasture over the winter, infestation can be carried in the ewe flock, resulting in reinfestation of the pasture in the spring, unless the animals are drenched in the spring and fall. He suggests it might also pay to treat feeder sheep in fall. He adds:

"Drenching each individual animal is the best way to administer phenothiazine. Dose each lamb with ½ ounce, and each mature sheep with 1 ounce of the drug. It may be mixed with a ½-ounce of black-strap or low-grade molasses, and diluted with 1 to 2 ounces of warm water before administering it as a drench. The dose may be given to the animal with a dose syringe, a funnel and tube, or with a long-necked bottle. It is essential to shake the mixture thoroughly."

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EXPERIMENTS IN SEVERAL STATES SHOW NEED FOR TREATING PEANUT SEED TO PREVENT SEED DECAY AND SEEDLING BLIGHT

"Experiments in several states during the past four years have indicated the desirability of treating peanut seed to prevent seed decay and seedling blight. These studies point to the need for seed treatment regardless of the quality of the seed or the method of shelling, and strongly emphasize the necessity of treating machine-shelled seed, particularly when its vitality is low.

Kerosene Not Needed to Repel Birds and Rodents

"In the past, many Virginia farmers have treated peanut seed with kerosene as a repellent to prevent birds and rodents from eating the seed after it has been sown. Every grower who was interviewed indicated that all three materials used in these tests* gave equally as good protection against these pests, and that oiling the seed would no longer be necessary." -- Dr. Edward K. Vaughan.

*The materials that gave the highest average increase in stand were "Arasan" fungicide and 2% "Ceresan" fungicide, as discussed below.

PEANUT GROWERS ENTHUSIASTIC ABOUT SEED TREATMENT

Peanut growers in Virginia were so favorably impressed by the results of seed treatment with chemicals in 1944 that many of them stated they "would never again plant untreated seed if seed treatment materials could be obtained," says Dr. E. K. Vaughan, former extension plant pathologist, Virginia Polytechnic Institute. Dr. Vaughan is now with the U. S. Bureau of Plant Industry, stationed at Tifton, Georgia.

In thirty different tests in four Virginia counties -- Greensville, Sussex, Surry, and Nansemond -- the average increase in stand from treatment with "Arasan" fungicide with hand-shelled seed was 39 per cent and with machine-shelled seed was 99 per cent.

"In the counties where soil and climatic conditions were normally most favorable for the growing of peanuts, and where favorable weather conditions in 1943 had resulted in the production of seed of excellent quality, very good stands were obtained whether the seed was hand or machine shelled and whether

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or not any chemical treatment was used," Dr. Vaughan says. "However, still better stands resulted from treatment of the seed."

Results of Peanut Seed Treatments in Virginia - 1944
Seed Treated with "Arasan" Fungicide, 2 ounces per 100 pounds of seed

Cooperator	County	Seed shelled by	Number plants per 200 ft. of row		Percent inc. in stand due to treatment
			Treated	Untreated	%
R. J. Brett, Emporia	Greensville	Machine	193	91	112
C. C. Jones, Emporia	Greensville	"	251	187	34
H. C. Bryant, Emporia	"	"	158	112	41
J. L. Mathews, Emporia	"	"	183	161	14
R. W. Brantley, Emporia	"	"	273	72	279
G. C. Holloway, Jarratt	"	"	162	41	295
" " " "	"	"	157	58	171
M. D. Jones, Stony Creek	Sussex	"	198	101	98
" " " " "	"	"	235	96	143
" " " " "	"	"	276	112	146
" " " " "	"	"	256	112	128
B. J. Rideout, Stony Creek	"	Hand	283	211	34
J. H. Mason, Stony Creek	"	"	191	101	90
B. D. Wingfield, " "	"	Machine	253	115	118
E. B. Parson, Jarratt	"	Hand	213	176	21
R. H. Parson, Jarratt	"	"	266	195	36
Oslen Parson, Jarrett	"	"	183	139	32
Carol Dunn, Gray	"	"	169	122	38
Chas. Dunn, Jr., Yale	"	Machine	178	42	324
Sol Jenkins, Wakefield	"	Hand	250	203	23
W. A. Beale, Waverly	"	Machine	267	207	29
J. J. Lilley, Waverly	"	Hand	215	160	34
Stuart Nicholson, Waverly	"	Machine	240	167	44
J. B. Jones, Disputanta	"	"	286	152	88
J. H. Seward, Elberon	Surry	"	228	181	20
" " " "	"	"	231	211	9
E. F. Huber, Dendron	"	"	273	222	23
" " " "	"	"	267	230	15
E. L. Felton, Holland	Nansemond	"	239	186	28
G. R. Holland, Suffolk	"	"	206	166	24

Average - Hand-shelled seed - 38.5% increase in stand
Average - Machine-shelled seed - 99.2% increase in stand

In the counties where soil and climatic conditions are not so favorable, and where the drouth in 1943 had resulted in the production of seed of uncertain quality, poor stands resulted from the planting of untreated seed, particularly where machine-shelled seed was used.

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"Here the benefits of seed treatment were outstanding," according to Dr. Vaughan. "Many fields which were planted with untreated seed had to be plowed up and replanted, using treated seed. Growers were enthusiastic about the results of the treatments and expressed an almost unanimous determination to treat all peanut seed in the future."

As a part of the investigations, three seed disinfectants were tested in 13 different experiments with machine-shelled seed. Treated seed was planted in adjacent plots in the same field, seed and soil for all treatments being uniform. With one unexplained exception, better stands resulted from the use of treated seed, regardless of material used, and the benefits were more outstanding in the counties where the seed was of poorer quality and growing conditions were less favorable, the Virginia scientist reports.

"Arasan" and 2% "Ceresan" Especially Efffective in Comparative Tests

Dr. Vaughan says "Arasan," containing tetramethyl thiuram disulfide, was especially effective, giving 100 per cent increase in stand; and that 2% "Ceresan" fungicide, containing ethyl mercury chloride, was almost as good, giving 94 per cent increase. The third material, "although fairly effective, generally was less so than the other two chemicals," giving only 67 per cent increase in stand. These results agree with those obtained during several seasons at the Holland, Va., Agricultural Experiment Station.

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NEW DU PONT MOTION PICTURE, "THE STORY OF PHENOTHIAZINE," NOW AVAILABLE

The historical development of "the drug that made history" is shown in Du Pont's new motion picture, "The Story of Phenothiazine," now available on a loan basis for presentation to farm groups throughout the country.

This new film contains many scenes on actual American farms and ranches in widely scattered sections of the country. It shows various methods of administering phenothiazine to sheep, cattle, goats, horses, mules, and poultry for control of certain internal parasites that cause tremendous economic losses to the livestock industry annually.

The motion picture is a two-reel, color and sound, presentation, running approximately 20 minutes. It was produced by the Grasselli Chemicals Department of the Du Pont Company, in cooperation with the United States Department of Agriculture which is credited with the discovery of the outstanding anthelmintic qualities of phenothiazine and which pioneered in the development of its use for worming animals.

Requests for prints should be made as far in advance of showing as possible, should indicate date desired, character of audience, and estimated attendance. Address requests to the Editor, Du Pont "Agricultural News Letter," Wilmington 98, Del.

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8-YEAR TEST SHOWS "URAMON" EXCELLENT SOURCE OF NITROGEN FOR APPLE TREES

At the end of an eight-year test which showed "no significant differences" in average growth and yield response of mature apple trees to applications of four standard nitrogen carriers, including "Uramon" fertilizer compound which contains urea, Dr. R. H. Sudds, Associate Horticulturist of the West Virginia Experiment Station, among his conclusions makes these statements:

> "'Uramon' has resulted in tree growth and production equal to any of the other nitrogen carriers under trial."
>
> "There is no doubt that urea is a perfectly satisfactory source of nitrogen for use in orchards under West Virginia conditions."

Four Nitrogen Carriers Included in West Virginia Experiment

Reporting in West Virginia Bulletin No. 315, July, 1944, Dr. Sudds says that the rates of application of each of the materials tested, to supply equivalent amounts of nitrogen to 20 York Imperial trees in each plot, were: Chilean nitrate of soda, 7 pounds per tree per year; sulfate of ammonia, 5¼ pounds; calcium cyanamid, 5¼ pounds; and crystal urea, 2¼ pounds (in 1942 and 1943 "Uramon" was used at the rate of 2½ pounds per tree.) Each carrier was broadcast uniformly by hand from the tip of the branches toward the trunk of the tree at least two weeks before bloom between mid-March and mid-April, except that in 1938, 1939, and 1940 cyanamid was applied in the fall.

No Significant Differences In Yields or Tree Circumferences

Total yields per tree for the 8-year period 1936-43, inclusive, and trunk circumferences at the beginning and the end of the test for each of the carriers were:

Nitrogen Carrier	Total Yield per Tree 8-yr.	Circumference 1936	Circumference 1943
	bu.	inches	inches
Sulfate of ammonia	100.2	35.2	42.1
"Uramon" fertilizer compound (urea)	94.2	35.3	41.8
Calcium cyanamid	91.7	35.0	41.1
Chilean nitrate of soda	91.1	35.4	41.7

No unfertilized trees were included since, according to Dr. Sudds, the apple tree which does not receive nitrogen at least every few years, is seldom commercially profitable under conditions existing in the Shenandoah Valley.

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Commenting on the results of the test, Dr. Sudds points out: "At the close of the experiment after the 1943 season, there were no significant differences in yield for the 8-year period between any of the four nitrogen carriers. The trunk circumferences, which averaged almost the same for all of the four groups at the start, were practically as close at the end."

Recommends Use of Lime With Sulfate of Ammonia and "Uramon"

Dr. Sudds concludes that "Chilean nitrate of soda, sulfate of ammonia and 'Uramon' may be expected to produce equally satisfactory results as sources of nitrogen for direct application to apple trees in West Virginia, when lime is used as necessary with sulfate and 'Uramon' for correcting soil reaction." He adds that if cyanamid is to be used, the application should be made only in the autumn, when soil moisture is more likely to be adequate than in the spring. The soil should not be frozen at the time.

The West Virginia horticulturist bases his recommendations for use of lime with sulfate of ammonia and "Uramon" on the fact that at the end of the test, the pH of the surface six inches of the soil (which was 5.4 at the start) was 5.93 for the cyanamid-fertilized areas, 5.63 for nitrate of soda, 4.85 for "Uramon", and 4.27 for sulfate of ammonia.

He points out that "Uramon" increased the soil acidity a little less than half as much as did the sulfate of ammonia, and adds:

"The theoretical difference is much less than this (for 100 pounds of 'Uramon', 75 pounds of limestone, $CaCO_3$, should be required to neutralize the acidity, while for 100 pounds of sulfate of ammonia, 110 pounds of limestone is required.) Liming at the rate of three-quarters of one pound of limestone for each pound of 'Uramon' applied during any period under consideration is therefore necessary if it is desired to maintain the original soil reaction."

Dr. Sudds goes on to say that although the use of sodium nitrate reduces the amount of lime needed to maintain a suitable soil reaction, it does not eliminate the necessity for liming.

He also points out that under a full spray schedule it is probable that even the nitrate of soda and cyanamid areas would have been more acid at the end of the experiment. This is due to the sulfur content of spray materials which tends to increase soil acidity. (An unusual spray program was followed in which no sprays were applied after the petal fall; this was a requirement of a second project in progress concurrently in the orchard.)

NOTE: A copy of West Virginia Bulletin No. 315, discussed above, will be sent upon request to Dr. R. H. Sudds, Department of Horticulture, University of West Virginia, Morgantown, W. Va.

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SCREWWORM INFESTATIONS SPREAD TO NORTHERN STATES

While screwworm infestations are heaviest in Southern livestock-producing states, reports from Missouri, Illinois, and other Northern states indicate a spread of these pests to areas heretofore considered more-or-less free from attack. The following, for instance, from "The Prairie Farmer," Vol. 116, No. 24, is indicative:

"Screwworm infestations have been found in 24 of 54 Illinois counties recently surveyed by federal entomologists. Farmers are cautioned to examine open wounds or scratches on animals where the screwworm fly may lay its eggs, and consult the local veterinarian or farm adviser if outbreaks are discovered. Control measures include treating open wounds with the preparation Smear 62, University of Illinois entomologists advise."

WORKERS SURVEYING SCREWWORM INFESTATIONS ALSO TELL STOCKMEN OF REMEDIES

Livestock growers of the Southeast in 1944 utilized, and this year have available for use, authoritative information given to them during a survey initiated in 1943 by the U. S. Department of Agriculture for guidance in their fight against screwworm infestations.

The Bureau of Entomology and Plant Quarantine cooperated with State agencies in western Kentucky, western Tennessee, Mississippi, Alabama, Florida, Georgia, and South Carolina. While this study, began in June, 1943, was made primarily to determine the extent and relative abundance of screwworm infestations, it served the further important purpose of acquainting large numbers of stockmen with Smear 62. This medicament, made of diphenylamine, benzol, turkey-red oil, and lampblack, is characterized as "the most effective screwworm remedy and preventive," by W. G. Bruce, government entomologist, in a report in the "Journal of Economic Entomology," Vol. 37, No. 5.

Control Methods Reduce Severity of Outbreak and Loss of Livestock

Mr. Bruce explains that investigators contacted 10 or more farmers and stockmen in each county, representing 15 to 20 per cent of all livestock in that county. He adds:

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"As a result of this survey, the incidence and relative abundance of screwworms throughout the Southeastern States were determined, and a fair estimate was obtained of needed critical insecticides. Furthermore, the survey ensured the proper distribution and conservation of these insecticides, and aided in the reduction of screwworm infestations and attendant losses.

"The survey acquainted stockmen with the most effective procedure and medicine for screwworm control. In a goodly number of cases these control practices were applied, and contributed to a reduction in losses and a reduction in the severity of the outbreak."

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PUERTO RICO EXPERIMENT STATION TESTS SHOW BAMBOO SOAKED IN UREA SOLUTION CAN BE BENT AT SHARP ANGLE WITHOUT FRACTURING

Studies conducted by the Puerto Rico Experiment Station at Mayaguez "indicated that bamboo, like some other woods, can be plasticized by treating with urea solution," according to Howard T. Love, assistant chemist there.

Discussing results of his tests in the 1943 annual report of the Station (published in 1944), Mr. Love says:

"The treatment of thin narrow strips of bamboo, used for the preparation of woven cane-like seats and backs of chairs, by soaking in 10 per cent urea solution for 24 hours, permitting bending through a sharp angle of 90 degrees without fracturing. The strips were most pliable when heated in the urea solution and bent while hot.

Urea Helps Maintain Higher Moisture Content of Leaves

"Ribless leaves of the royal palm (Roystonea regia (H.B.K.) Cook) are used extensively in Puerto Rico for weaving chair seats and backs of bamboo and other furniture, the cured leaves ordinarily being moistened with water and twisted by hand into cords. On becoming dry some of the fibers of the cords tend to fracture. To overcome this tendency an experiment was carried out in cooperation with the Puerto Rico Development Co., in which dried palm leaves were soaked in a 10 per cent urea solution for 12 to 48 hours. When air-dried or when placed in the shade in a humid atmosphere the leaves thus treated remained more pliable than similar untreated leaves under the same conditions. When oven-dried or dried in the sun they became as brittle as the untreated leaves. There were no apparent differences in these respects among lots soaked 12 hours and 48 hours at room temperature, treated with hot urea solution, and untreated. The conclusion reached was that a single urea treatment at least temporarily made the leaves more pliable. The effect of the urea appeared to be more that of maintaining a higher moisture content in the leaves than acting as a plasticizer."

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Agricultural News Letter (Du Pont)
Vol. 13 No. 2 March-April, 1945

FEDERAL AGRICULTURAL RESEARCH WORTH HUNDREDS OF MILLIONS ANNUALLY

Some of the scientific projects of the U. S. Department of Agriculture during recent years "have resulted in such outstanding advances in knowledge and practical aids in farming that their value, mostly in money saved through reduced losses in crops and animals, must be estimated at hundreds of millions of dollars annually."

So says Marion J. Drown in the Department's "Extension Service Review," Vol. 15 No. 9.

ARA Issues Achievement Sheets on Outstanding Research Successes

Mr. Drown announced that, to make available the stories of some of the achievements that have made research history, the Agricultural Research Administration of the Department is putting out a series of leaflets called "Research Achievement Sheets."

Each gives a brief description of the problem, nature of research required, by whom and when done, estimate of cost, results, and benefits from its adoption.

List of First Sixteen Leaflets Shows Importance of Chemicals

Several of the first 16 "Research Achievement Sheets" show the importance of chemicals to agriculture. The titles follow:

Cattle fever research advances medical knowledge.
Chemical treatment for gapeworms in chickens.
Hog cholera conquered by serum-virus treatment.
Phenothiazine, versatile drug for controlling livestock parasites.
Maximum hatches from hen's eggs.
Protecting man against trichinosis.
Producing more beef from phosphorus-deficient ranges.
Strain 19 vaccine curbs losses from brucellosis.
Simple test effective in pullorum disease control.
Preservative prevents feather loss.
Sanitation system controls swine roundworms.
Small-type turkey successfully developed.
Suppressing Japanese beetles by use of milky disease.
Life of peach trees materially prolonged by control of borers.
Smear 62 curbs spread of screwworm and livestock losses.
Oil-insecticide treatment of sweet corn for earworm control.

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